

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE
 in its capacity as elected Office

Date of mailing (day/month/year) 21 June 2001 (21.06.01)	Applicant's or agent's file reference 2339668/MRO
International application No. PCT/AU00/01183	Priority date (day/month/year) 24 September 1999 (24.09.99)
International filing date (day/month/year) 22 September 2000 (22.09.00)	
Applicant RICHARDSON, Alan, Edward et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
 19 April 2001 (19.04.01)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Cécile Chatel (Fax 338.87.40) Telephone No.: (41-22) 338.83.38
---	---

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:

DAVIES COLLISON CAVE
1 Little Collins Street
MELBOURNE VIC 3000

PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL SEARCH REPORT
OR THE DECLARATION

(PCT Rule 44.1)

Resp due 24.1.015

Date of mailing
(day/month/year)

- 6 NOV 2000

Applicant's or agent's file reference
2339668 *MC*

FOR FURTHER ACTION See paragraphs 1 and 4 below

International application No.

PCT/AU00/01183

International filing date

22 September 2000

Applicant

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION et al

1. ☒ The applicant is hereby notified that the international search report has been established and is transmitted herewith

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the international search report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Facsimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. ☐ **With regard to the protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

- ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.
☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after **18 months** from the priority date, the international application will be published by the International Bureau.

If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

Within **19 months** from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later)

Within **20 months** from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the ISA/AU

AUSTRALIAN PATENT OFFICE
PO BOX 200, WODEN ACT 2606, AUSTRALIA
E-mail address: pct@ipaustalia.gov.au
Facsimile No. (02) 6285 3929

Authorized officer

TERRY MOORE

Telephone No. (02) 6283 2632

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 2339668	<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">FOR FURTHER ACTION</div> <div>see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.</div> </div>	
International application No. PCT/AU00/01183	International filing date (day/month/year) 22 September 2000	(Earliest) Priority Date (day/month/year) 24 September 1999
Applicant COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION et al		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 4 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☒ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (See Box II).

4. With regard to the **title**, ☐ the text is approved as submitted by the applicant.

☒ the text has been established by this Authority to read as follows:

Expression of Phytase in Plants as a Method of Modifying Plant Productivity

5. With regard to the **abstract**, ☒ the text is approved as submitted by the applicant

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☐ as suggested by the applicant.

☒ None of the figures

☐ because the applicant failed to suggest a figure

☐ because this figure better characterizes the invention

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU00/01183

A. CLASSIFICATION OF SUBJECT MATTERInt. Cl. ⁷: A01H 5/00, 5/06 C12N 15/62

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

WPIDS, CA - SEE BELOW

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
AGRICOLA, GENBANK, EMBL - SEE BELOW

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPIDS: A01H, phytase GENBANK, EMBL: Translation of SEQ ID NO 2

CA, AGRICOLA: phytase, plant, transgenic, recombinant, transformed

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 900 525 A (AUSTIN-PHILLIPS, S et al) 4 May 1999 See the entire document.	26, 27, 46
X	GenPept Accession No. BAA74433 Nagashima, T. et al "Phytase having high affinity for phytic acid" 26 January 1999 See the sequence and GAP analysis.	44

☒ Further documents are listed in the continuation of Box C ☒ See patent family annex

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 23 October 2000	Date of mailing of the international search report - 6 NOV 2000
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized officer TERRY MOORE Telephone No : (02) 6283 2632

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU00/01183

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Ullah, A.H.J. et al (1999) "Characterisation of recombinant fungal phytase (<i>phyA</i>) expressed in tobacco leaves" Biochem. Biophys. Res. Comm. 264, pages 201-6 See the entire document.	26, 27, 44-48
X	US 5 780 292 A (NEVALAINEN, H.K.M. et al) 14 July 1998 See in particular SEQ ID NO 8	44
X	US 5 593 963 A (VAN OOIJEN, A.J.J. et al) 14 January 1997 See the entire document.	26, 27, 46

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/AU00/01183

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report				Patent Family Member			
US	5 780 292	EP	659215	FI	950202	WO	9403612
US	5 593 963	AU	77766 91	CA	2056396	EP	449375
		FI	915477	HU	60780	NZ	237550
		PT	97111	WO	9114782		
END OF ANNEX							

PATENT COOPERATION TREATY

TUESDAY 07 AUG 2001

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

To:

DAVIES COLLISON CAVE
1 Little Collins Street
MELBOURNE VIC 3000

Date of mailing
day/month/year

06 AUG 2001

Applicant's or agent's file reference
2339668/MRO/CN

IMPORTANT NOTIFICATION

International Application No.
PCT/AU00/01183

International Filing Date
22 September 2000

Priority Date
24 September 1999

Applicant

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION et al

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translations to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices)(Article 39(1))(see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide

Name and mailing address of the IPEA/AU

AUSTRALIAN PATENT OFFICE
PO BOX 200, WODEN ACT 2606, AUSTRALIA
E-mail address: pct@ipaaustralia.gov.au
Facsimile No. (02) 6285 3929

Authorized officer

TERRY MOORE
Telephone No. (02) 6283 2632

PATENT COOPERATION TREATY
PCT
INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 2339668/MRO/CN	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).
International Application No. PCT/AU00/01183	International Filing Date (<i>day/month/year</i>) 22 September 2000	Priority Date (<i>day/month/year</i>) 24 September 1999
International Patent Classification (IPC) or national classification and IPC Int. Cl. ⁷ A01H 5/00 C12N 15/62		
Applicant COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION et al		

1.	This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2.	This REPORT consists of a total of 4 sheets, including this cover sheet. <input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT). These annexes consist of a total of 3 sheet(s).
3.	This report contains indications relating to the following items: I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input checked="" type="checkbox"/> Certain observations on the international application

Date of submission of the demand 19 April 2001	Date of completion of the report 1 August 2001
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer TERRY MOORE Telephone No. (02) 6283 2632

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/AU00/01183

I. Basis of the report1. With regard to the **elements** of the international application:*☐ the international application as originally filed.☒ the description, pages **1-80**, as originally filed,pages , filed with the demand,
pages , received on with the letter of☒ the claims, pages **81-83 and 85**, as originally filed,pages **84, 86 and 87**, as amended (together with any statement) under Article 19,
pages , filed with the demand,☒ the drawings, pages **1/24-24/24**, as originally filed,pages , filed with the demand,
pages , received on with the letter of☒ the sequence listing part of the description:pages **1-25**, as originally filed

pages , filed with the demand

pages , received on with the letter of

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).☐ the language of publication of the international application (under Rule 48.3(b)).☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:☐ contained in the international application in written form.☒ filed together with the international application in computer readable form.☐ furnished subsequently to this Authority in written form.☐ furnished subsequently to this Authority in computer readable form.☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished4. ☐ The amendments have resulted in the cancellation of:☐ the description, pages☐ the claims, Nos.☐ the drawings, sheets/fig.5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims 1-49	YES
	Claims	NO
Inventive step (IS)	Claims 1-43	YES
	Claims 44-49	NO
Industrial applicability (IA)	Claims 1-49	YES
	Claims	NO

2. Citations and explanations (Rule 70.7)

The following documents identified in the International Search Report have been considered for the purposes of this report:

- D1 US 5 900 525
- D2 GenPept Accession No. BAA74433
- D3 Ullah et al (1999) Biochem Biophys Res Comm 264, 201-6
- D4 US 5 5780 292
- D5 US 5 593 963

The specification discloses a method of enhancing plant nutrition by engineering a transgenic plant that secretes a recombinant phytase from its roots. The specification also discloses the isolation of a novel *aspergillus* phytase that shares a high level of sequence homology with prior art *aspergillus* phytases.

Novelty (N)

None of the documents disclose a method of enhancing transgenic plant nutrition through the use of a recombinant phytase or a phytase with the sequences defined in SEQ ID NOS 1, 2, 9 or 10. Therefore none of the citations impinge on the novelty of the claims.

Inventive Step (IS)

D1, D3 and D5 disclose transgenic plants that express secreted recombinant phytases. However none of the documents disclose or teach toward the use of this system to improve plant nutrition. Therefore claims 1-43 are inventive in light of the documents.

However the documents do disclose phytase constructs comprised of plant regulatory sequences, secretory signal sequences and fungal phytase coding regions. All of the cited constructs provide expression of active, secreted phytases that appear to be functional equivalents of the constructs defined in claims 44-49. As such, in the absence of suggestion that PhyA-2 or the specific combination of the carrot extensin secretory signal and PhyA-2 provide unexpected advantages over the prior art, any one of D1, D3 or D5 deprive claims 44-49 of an inventive step.

D2 and D4 disclose an *aspergillus* phytase sequence with very high homology to PhyA-2. Although neither document discloses the use of the sequence to generate transgenic plants, or constructs comprising a carrot extensin secretory signal and a phytase, both documents do disclose sequences that appear to be the functional equivalents of PhyA-2. Therefore, in the absence of identification of features specific to PhyA-2 that provide unexpected advantages over the sequences disclosed in D2 or D4, claims 44, 45 and 47 appear to lack an inventive step.

VIII. Certain observations on the international application

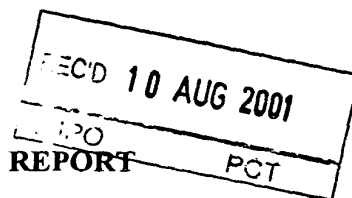
The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claim 47 lacks clarity. The claim defines a PhyA-2 chimeric gene sequence set forth in SEQ ID NO 1, however SEQ ID NO 1 does not appear to disclose a chimeric gene sequence. SEQ ID NO 1 appears to disclose the non-chimeric *aspergillus* phytase sequence.

14

PATENT COOPERATION TREATY
PCT
INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference 2339668/MRO/CN	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).
International Application No. PCT/AU00/01183	International Filing Date (<i>day/month/year</i>) 22 September 2000	Priority Date (<i>day/month/year</i>) 24 September 1999
International Patent Classification (IPC) or national classification and IPC Int. Cl. ⁷ A01H 5/00 C12N 15/62		
Applicant COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION et al		

1.	This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.																								
2.	This REPORT consists of a total of 4 sheets, including this cover sheet. <input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT). These annexes consist of a total of 3 sheet(s).																								
3. This report contains indications relating to the following items: <table style="width: 100%; margin-top: 10px;"> <tr> <td style="width: 5%;">I</td> <td style="width: 5%;"><input checked="" type="checkbox"/></td> <td>Basis of the report</td> </tr> <tr> <td>II</td> <td><input type="checkbox"/></td> <td>Priority</td> </tr> <tr> <td>III</td> <td><input type="checkbox"/></td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td>IV</td> <td><input type="checkbox"/></td> <td>Lack of unity of invention</td> </tr> <tr> <td>V</td> <td><input checked="" type="checkbox"/></td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td>VI</td> <td><input type="checkbox"/></td> <td>Certain documents cited</td> </tr> <tr> <td>VII</td> <td><input type="checkbox"/></td> <td>Certain defects in the international application</td> </tr> <tr> <td>VIII</td> <td><input checked="" type="checkbox"/></td> <td>Certain observations on the international application</td> </tr> </table>		I	<input checked="" type="checkbox"/>	Basis of the report	II	<input type="checkbox"/>	Priority	III	<input type="checkbox"/>	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	IV	<input type="checkbox"/>	Lack of unity of invention	V	<input checked="" type="checkbox"/>	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	VI	<input type="checkbox"/>	Certain documents cited	VII	<input type="checkbox"/>	Certain defects in the international application	VIII	<input checked="" type="checkbox"/>	Certain observations on the international application
I	<input checked="" type="checkbox"/>	Basis of the report																							
II	<input type="checkbox"/>	Priority																							
III	<input type="checkbox"/>	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability																							
IV	<input type="checkbox"/>	Lack of unity of invention																							
V	<input checked="" type="checkbox"/>	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement																							
VI	<input type="checkbox"/>	Certain documents cited																							
VII	<input type="checkbox"/>	Certain defects in the international application																							
VIII	<input checked="" type="checkbox"/>	Certain observations on the international application																							

Date of submission of the demand 19 April 2001	Date of completion of the report 1 August 2001
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer TERRY MOORE Telephone No. (02) 6283 2632

I. Basis of the report1. With regard to the **elements** of the international application:*

- ☐ the international application as originally filed.
- ☒ the description, pages **1-80**, as originally filed,
pages , filed with the demand,
pages , received on with the letter of
- ☒ the claims, pages **81-83 and 85**, as originally filed,
pages **84, 86 and 87**, as amended (together with any statement) under Article 19,
pages , filed with the demand,
pages , received on with the letter of
- ☒ the drawings, pages **1/24-24/24**, as originally filed,
pages , filed with the demand,
pages , received on with the letter of
- ☒ the sequence listing part of the description:
pages **1-25**, as originally filed
pages , filed with the demand
pages , received on with the letter of

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☒ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/fig.

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims 1-49	YES
	Claims	NO
Inventive step (IS)	Claims 1-43	YES
	Claims 44-49	NO
Industrial applicability (IA)	Claims 1-49	YES
	Claims	NO

2. Citations and explanations (Rule 70.7)

The following documents identified in the International Search Report have been considered for the purposes of this report:

D1 US 5 900 525
D2 GenPept Accession No. BAA74433
D3 Ullah et al (1999) Biochem Biophys Res Comm 264, 201-6
D4 US 5 5780 292
D5 US 5 593 963

The specification discloses a method of enhancing plant nutrition by engineering a transgenic plant that secretes a recombinant phytase from its roots. The specification also discloses the isolation of a novel *aspergillus* phytase that shares a high level of sequence homology with prior art *aspergillus* phytases.

Novelty (N)

None of the documents disclose a method of enhancing transgenic plant nutrition through the use of a recombinant phytase or a phytase with the sequences defined in SEQ ID NOS 1, 2, 9 or 10. Therefore none of the citations impinge on the novelty of the claims.

Inventive Step (IS)

D1, D3 and D5 disclose transgenic plants that express secreted recombinant phytases. However none of the documents disclose or teach toward the use of this system to improve plant nutrition. Therefore claims 1-43 are inventive in light of the documents.

However the documents do disclose phytase constructs comprised of plant regulatory sequences, secretory signal sequences and fungal phytase coding regions. All of the cited constructs provide expression of active, secreted phytases that appear to be functional equivalents of the constructs defined in claims 44-49. As such, in the absence of suggestion that PhyA-2 or the specific combination of the carrot extensin secretory signal and PhyA-2 provide unexpected advantages over the prior art, any one of D1, D3 or D5 deprive claims 44-49 of an inventive step.

D2 and D4 disclose an *aspergillus* phytase sequence with very high homology to PhyA-2. Although neither document discloses the use of the sequence to generate transgenic plants, or constructs comprising a carrot extensin secretory signal and a phytase, both documents do disclose sequences that appear to be the functional equivalents of PhyA-2. Therefore, in the absence of identification of features specific to PhyA-2 that provide unexpected advantages over the sequences disclosed in D2 or D4, claims 44, 45 and 47 appear to lack an inventive step.

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claim 47 lacks clarity. The claim defines a PhyA-2 chimeric gene sequence set forth in SEQ ID NO 1, however SEQ ID NO 1 does not appear to disclose a chimeric gene sequence. SEQ ID NO 1 appears to disclose the non-chimeric *aspergillus* phytase sequence.